June 5, 1956 D. W. MOLINS 2,748,776

METHOD OF AND APPARATUS FOR MAKING MOUTHPIECE CIGARETTES OF OVAL CROSS-SECTION

Filed Nov. 30, 1951 2 Sheets-Sheet 1

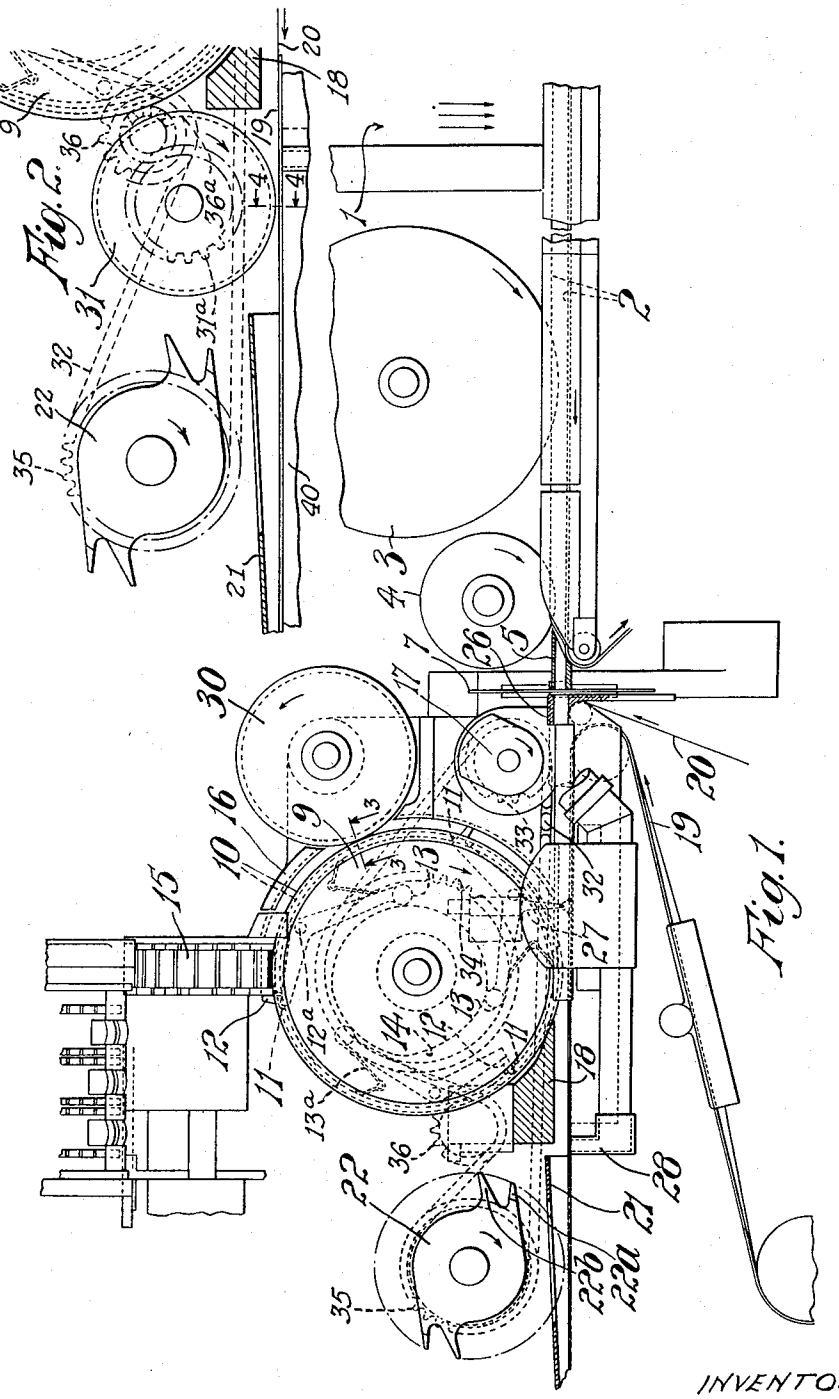


Fig. 1.

Fig. 2.

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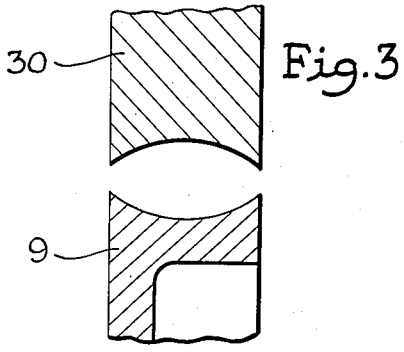


Fig.3

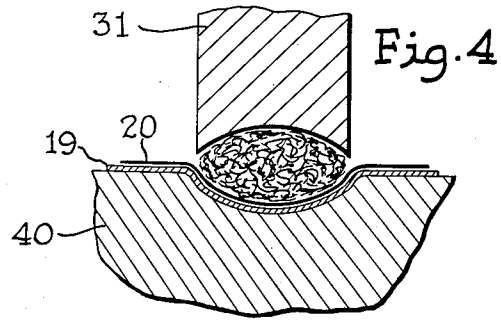


Fig.4

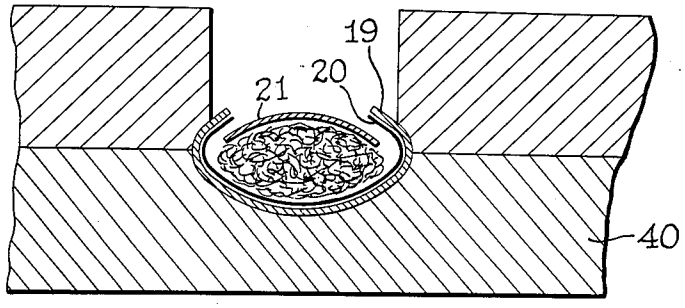


Fig.5

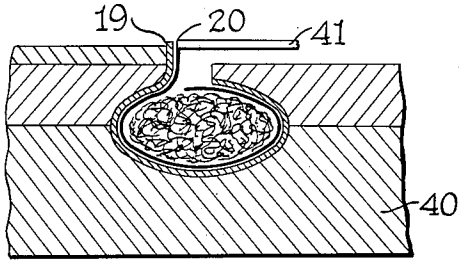


Fig.6

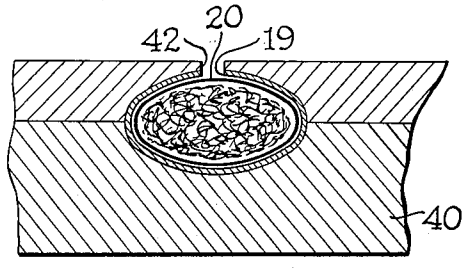


Fig.7

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METHOD OF AND APPARATUS FOR MAKING MOUTHPIECE CIGARETTES OF OVAL CROSS-SECTION

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Application November 30, 1951, Serial No. 259,029

Claims priority, application Great Britain December 12, 1950

4 Claims. (Cl. 131—61)

This invention concerns improvements in or relating to a method of and apparatus for making mouthpiece cigarettes of oval cross-section.

One way of making mouthpiece cigarettes consists in feeding unwrapped lengths of tobacco at intervals, with mouthpiece portions interrupting the continuity of the stream of unwrapped tobacco so as to form a continuous composite filler, which is enclosed in a wrapper to form a continuous composite rod, the rod being then separated at suitable intervals to produce mouthpiece cigarettes. The present invention is concerned with the manufacture of mouthpiece cigarettes of oval cross-section according to this general method.

The mouthpiece portions may for example be made of paper or other suitable material, and may include absorbent material, in which case the mouthpiece portions are sometimes known as "filterplugs" or "filter tips," or they may be made entirely of non-absorbent material. For convenience, all mouthpiece portions suitable for incorporation in mouthpiece cigarettes of oval cross-section which are made in the manner hereafter described will be referred to hereinafter as "stubs."

The term "oval" is used in the trade to include all cigarettes of elliptical transverse cross-section and those of a generally similar shape other than round. Some have sharp points at the ends of the major axis and some have substantially semi-circular ends joined by substantially flat portions.

According to the invention there is provided a method of manufacturing mouthpiece cigarettes of oval cross-section comprising feeding unwrapped tobacco at intervals, with mouthpiece portions interrupting the continuity of the stream of unwrapped tobacco so as to form a continuous composite filler, which is enclosed in a wrapper to form a continuous composite rod which is thereafter separated at suitable intervals to produce mouthpiece cigarettes, wherein round stubs are fed from a supply to furnish said mouthpiece portions and are thereafter deformed to substantially oval section. For example, they may be deformed before being placed in line with the unwrapped tobacco, or before the composite filler is shaped to its final form or, where the stubs are of sufficiently soft material, deforming may take place during said shaping. The invention further includes mouthpiece cigarettes of oval cross-section made according to said method.

The invention will be more fully described with reference to the accompanying drawings in which:

Figure 1 is a front elevation, partly in section, of apparatus for forming and cutting a tobacco filler and incorporating stubs therein to make a composite rod.

Figure 2 is a modification to part of Figure 1 showing a different way of carrying the invention into effect.

Figure 3 is a cross-section of Figure 1 on the line 3—3.

Figure 4 is a cross-section of Figure 2 on the line 4—4.

Figures 5 to 7 are progressive sections along a garniture

in which the mouthpiece cigarettes are shaped and enclosed in a paper wrapper.

Before Figure 1 of the drawing is described it is pointed out that it represents one form of apparatus at present in use for making cigarettes according to the aforesaid general method, said apparatus being slightly modified for the production of oval cigarettes.

Referring to Figure 1 of the drawings tobacco is showered from a hopper indicated diagrammatically at 1 on to a moving conveyor 2, consisting of an endless band, which conveys the showered tobacco lengthwise as a loose stream or filler of unwrapped tobacco. One or more compression rollers, such as 3 and 4, are provided which compress the stream laterally so as to impart to it a suitable cross-sectional size and shape, and also sufficient rigidity to enable it to pass from the end of the conveyor into and through a short guide tube 5 which is located just beyond the compression rollers.

A cutting device 7 is located adjacent the end of the guide tube and is adapted at intervals to cut across the tobacco filler as it issues from the guide tube. The cutting device comprises a relatively narrow knife blade which is caused to cut across the filler at high speed, so that the guide tube is blocked only for a very short time, and thus there is very little holding up of the tobacco filler in the guide tube.

Beyond the knife is a short outlet guide tube 26.

A paper web 20 is supported on a conveyor belt 19 and moves in the direction of the arrow at a higher speed than that of the uncut filler and of the conveyor 2.

Arranged above the paper web 20 is a wheel, also referred to as a "stub wheel," which is arranged to cause stubs to be placed at intervals on the paper web between successive portions of the tobacco filler. This stub-wheel whose axis of rotation lies across the direction of movement of the filler, consists of a large disc 9 having a concave rim 10, like some compression wheels. The periphery is perforated at, for example, three equally spaced positions 11, and retractable stub pushing devices 12 are provided within the body of the disc which move in and out of the holes as the disc rotates, when cam followers 13 attached to the pushing devices rotate about a fixed cam 14. The pushing devices 12 consist of levers pivoted at 12*a*, one end of each lever being arranged to move in and out of a hole 11 while the other end carries a cam follower 13. Springs 13*a* are provided to urge the levers in a direction to hold the cam followers on the cam.

A suitable stub feeding device comprising a fluted drum 15 is provided to feed round stubs to the wheel at the top thereof, and these are carried round in turn by the pushers 12. The fluted drum and the mechanism for feeding stubs into its flute are constructed and operated in any suitable and convenient known manner.

At the side of the wheel where the stubs pass, a shield 16 is arranged to prevent stubs from leaving the concave rim, and at the bottom of the wheel each stub is delivered into a space between two filler portions. As a stub is delivered in this manner the pusher 12 is retracted by the cam 14. A pressure wheel 30 having a concave rim is arranged as shown so that during its movement with the stub wheel 9 each round plug has to pass between the wheel 9 and the wheel 30. The concave rims of the two wheels define a passage of substantially oval cross-section, see Figure 3, and so a stub is squeezed to this shape by passage between the wheels. The wheel 30 merely rotates as a stub passes between it and the wheel 9.

A small drive-roller 17 is provided above the paper web near the outlet guide tube 26. The roller 17 is in the nature of a sector whose arcuate part is so arranged that it is clear of the tobacco just prior to the cut, and immediately after the cut engages the tobacco to cause the

latter to travel at the faster speed of the paper web. This drive-roller is so shaped as to move out of engagement with the tobacco which has not been cut. In this way, the tobacco, before being cut, is allowed as far as possible to slip on the faster moving paper web **20**. The stub-wheel **9** also has the further function of engaging the tobacco filler at desired times so as to cause the tobacco to be pressed down against the paper web after the tobacco has been cut, so as to ensure that the cut portion travels at the speed of the paper web. This may be at the moment that the roller **17** engages the tobacco to accelerate it, or at a time when the cut-off length has passed beneath the roller **17**.

Just beyond the stub wheel, and located above the second conveyor is a scraper shoe **18** to remove any tobacco which tends to move up with the wheel after the delivery of a stub and which may act also as a compression shoe beneath which the stubs and separated portions of tobacco filler pass as a composite stream. This shoe is arranged with one end in contact, or nearly so, with the edge of the wheel so as to ensure that the stubs and the tobacco are properly stripped from the wheel.

The cutting of the unwrapped filler occurs when an appropriate length of filler is already on the paper web. Immediately after cutting the rotatable sector **17** referred to above is caused to engage the cut length of tobacco to press it against and move with the paper web and thereby cause the cut length to move forward quickly with the speed of the paper web. In this way the cut portions are accelerated and spaced apart. Stubs are inserted in the gaps so formed by the stub-wheel as above described.

It will be seen that the speed ratio of the first conveyor **2** to the paper web **20** must be so chosen that the gaps formed between the tobacco portions on the paper web (which moves at the faster, and final, speed) are no greater than necessary for the accommodation of stubs. It is important that the stubs and tobacco portions on the composite rod should abut closely, and since the speed of the stubs and tobacco portions cannot be reduced so as to close any gaps after the stubs are introduced between the tobacco portions (since the stubs and tobacco are carried on the paper web) the gaps must be of no more than just sufficient length to accommodate stubs in closely abutting relationship to the tobacco portions.

In order to insert the stubs into these gaps, the stub-wheel **9** is arranged to rotate at a faster (e. g. 10%–20% faster) peripheral speed than the speed of the paper web **20**. Thus a stub, while being delivered from the stub-wheel into a gap between tobacco portions on the paper web, moves faster than the tobacco portions. As the stub moves forwardly and downwardly into the gap, its leading end engages the rear end face of the preceding tobacco portion and due to its greater speed (since the stub is still being pushed by a pusher **12** on the stub-wheel) pushes the tobacco forward a little and thus compacts and compresses the tobacco in the region of the rear end of that tobacco portion. This widens the gap slightly and leaves enough room for the stub to fit in between the two tobacco portions.

The natural resilience of the tobacco causes the compressed end part of the preceding tobacco portion to expand again when it is free to do so—that is, when the pusher **12** is retracted into the wheel **9** and no longer pushes the stub forward at the faster speed—and it is thought that this alone tends to close up the enlarged gaps to a considerable extent.

Thus a continuous composite filler of tobacco portions and stubs in alternation is formed on the paper web **20** and carried thereby beneath a tongue **21** forming part of what is known as a garniture wherein the rod is shaped to its desired size and form and the paper web is wrapped around and sealed to produce a composite cigarette rod.

The shape of the interior of the garniture is shown in Figures 5 to 7. The main element of a garniture is a support plate, like that marked **40**, which is grooved to support the conveyor and paper web and to define the lower half of the passage. The other half is defined by plates of various sizes and shapes disposed along the length of the plate **40** to give the passage the desired cross-section at each different point along said length. At Figure 5 a part of the tongue **21**, Figure 1, is shown and the paper web **20** and conveyor **19** enclose all the tobacco other than that confined by the tongue. A little later the size of the passage through the garniture has been reduced, as in Figure 6, and an edge of the paper web turned up for the application of paste by a wheel **41**. Later still the passage is almost entirely closed save for a slot **42** through which a hot bar (not shown) engages the pasted lap of the paper web to seal the seam.

A timing device consisting of a rotary member **22** is provided in order to correct any rearward displacement of a stub when the latter is beneath the tongue **21**, and also to advance tobacco behind the stub so as to fill any gap or sparsely filled portion behind the stub and thus cause close abutting of the stub and tobacco. The rotary member has a thin blade-like finger **22***a* which on rotation of the member **22** moves down into the path of the composite filler a short distance (e. g. 3 mm.) behind the stub, and on further rotation of the member **22** moves forwardly at a faster speed than the paper web, the speed difference being such that by the time the finger withdraws from the path of the filler it has, during its period of travel in that path, moved about 6 mm. further than has the filler in that period. Due to its thinness, the finger **22***a* can generally pass at least partially through the tobacco behind the stub and thus tends to engage the rear end of the stub itself in order to advance it a desired amount.

The tobacco-advancing finger **22***b* also moves down into the path of the filler after the finger **22***a* and engages and advances tobacco behind the stub. The angle between the two fingers is sufficient to cause the finger **22***a* to leave the path of the filler an appreciable time before the finger **22***b*, which latter therefore continues for a short time to advance tobacco after the finger **22***a* has moved out of engagement with the stub, and can thus close up any gap behind the stub.

The tongue **21** is suitably slotted as shown to enable the fingers to pass through it.

The stubwheel **9**, roller **17**, and member **22** are rotated in timed relationship by means of a chain **32** passing over sprockets **33, 34, 35** and **36**.

In order to reduce any tendency for fragments of tobacco or dust to accumulate on the paper web in the gaps between tobacco portions a blowing device **27** is provided and arranged to blow across the paper **20** where a gap occurs, just before and during the insertion of a stub. The blowing device is operated intermittently and is timed so as to blow air only across gaps between tobacco portions, so as to clean the paper where gaps occur without unduly disturbing the tobacco in the tobacco portions. As the operation of this device is liable to cause dust in the surrounding air and because it is necessary to keep the exterior surface of the paper web clean a suction nozzle **28** is provided. As the composite filler moves along with the paper web **20** it passes beneath the tongue **21** and through the remainder (not shown in Figure 1) of a garniture of the usual type.

The tongue **21** and the garniture above referred to and indeed all subsequent parts of the machine follow orthodox continuous rod cigarette making machine practice, so no further detailed description is necessary, except to state that the tongue and garniture parts are of the shape appropriate to the production of oval cigarettes.

The paper web is folded and secured about the continuous composite filler so as to form a continuous composite rod of oval cross-section which passes to the usual cut-off device which cuts the rod so as to produce oval mouthpiece cigarettes. The stubs and the tobacco portions of the composite rod are double the length of the corresponding portions in a finished mouthpiece cigarette

and therefore the cut-off is timed to cut the rod in the middle of each stub portion and each tobacco portion to produce individual mouthpiece cigarettes.

Another way of carrying out the invention is shown in Figure 2 where a presser device consists of a roller **31** having a rim of concave cross-section, the chosen section being substantially half that of the desired oval shape. The roller **31** is driven by means of a gear **31***a* on the roller meshing with a gear **36***a* on the sprocket **36**, which, as mentioned above, is driven by the chain **32** which also drives the stub-wheel **9**, roller **17** (not shown in Figure 2) and member **22**. The support **40** for the paper **20** and tape **19** is also concave to some extent, see Figure 4, so as to co-operate with the roller to squeeze the stub, which is fed to the composite rod as a round stub, between roller and tape substantially to the desired cross-section. It will be appreciated that the tobacco filler will also be shaped in a similar manner but this does not matter and is likely to be advantageous. In this case, of course, round stubs are fed down on to the paper **20**.

The stub and filler move beneath the tongue **21** and thereafter through the garniture which is, as before constructed to produce cigarettes of oval cross-section.

It will be well understood that the final passage of assembled stubs and cigarettes through the garniture of the machine where the pressure is severe will help to shape or consolidate the shaping of the round stubs to oval cross-section.

What I claim as my invention and desire to secure by Letters Patent is:

1. Apparatus for making mouthpiece cigarettes of oval cross-section, comprising means to feed an unwrapped stream of tobacco forwardly, means to sever the stream so as periodically to separate therefrom a leading length thereof, means to form spaces between successive lengths of tobacco, means to feed round stubs from a supply toward said spaces and to deform them to a desired oval cross-section while they are being so fed, means to insert said deformed stubs into said spaces so as to form a continuous composite filler of tobacco lengths and stubs in alternation, means to form said tobacco lengths in said filler to the same oval cross-section and means to fold and secure a paper web about the composite filler so as to form a composite rod of oval cross-section.

2. Apparatus as claimed in claim 1, wherein the means to feed and deform the round stubs comprises a feed wheel having a concave rim to receive round stubs and feed them endwise toward the said spaces, and a compression element having a concave surface adjacent and opposed to said concave rim and so located as to press against stubs carried on said concave rim, the said concave rim and concave surface being so shaped as to define between them a passage of desired oval cross-section.

3. Apparatus as claimed in claim 2, wherein the said compression element is a rotatable wheel with a concave rim.

4. Apparatus for making mouthpiece cigarettes of oval cross-section, comprising means to feed separate lengths of unwrapped tobacco lengthwise with spaces between their ends, a supply for stubs of round cross-section, means to feed said stubs from said supply and insert them in said spaces, rod forming means to enclose said lengths of tobacco and said stubs in a continuous wrapper to form a composite cigarette rod of a desired oval cross-section, and means including a rotatable compression device located between said supply for stubs and said rod forming means to deform the stubs to the same desired oval cross-section after the stubs have been fed from said supply.

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